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| 09/407,184 | 09/27/1999 | FARSHAD KHORRAMI | 457020-2250. | 2412 |

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EXAMINER

CONTEE, JOY KIMBERLY

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2681

DATE MAILED: 12/21/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/407,184

Applicant(s)

Khorrami et al.

Examiner

Joy K. Contee

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Sep 27, 1999
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-38, 40, and 42-47 is/are rejected.
- 7) ☒ Claim(s) 39 and 41 is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirements.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 20) ☐ Other: _____

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DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 44 and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by Tyburski et al. ("Tyburski"), U.S. Patent No. 4,912,471.

Regarding claim 44, Tyburski discloses an element for use in a system for monitoring and/or deforming a structure in a desired manner, said element having a single antenna and being located on or within said structure, in which energy is provided to said element from a signal transmitted to said antenna in a wireless manner (col. 1, lines 28-35, col. 3, lines 28- col. 4, line 47 and col. 14, lines 36-59).

Regarding claim 45, Tyburski discloses an element as in claim 44, further having energy storage device and wherein energy is supplied to said energy storage device from the transmitted signal for storage thereat (col. 3, lines 55-67).

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Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1,2,6-9,13-15,17,18,21,22,25,27,37, 38 and 40 are rejected under 35

U.S.C. 103(a) as being unpatentable over Tyburski et al. ("Tyburski"), U.S. Patent No.

4,912,471, in view of Spillman, Jr., U.S. Patent No. 5,440,300.

Regarding claims 1 and 6, Tyburski et al. disclose a wireless interrogator-responder communication system (Fig. 1) wherein one or more sensors located on target element 32 is adaptable to detect a predetermined characteristic, such as the pressure as required by claim 6, of the element, and control transceiver means 42 is operable to communicate wirelessly with the target element for supplying a power signal to target element and enable the one or more sensors to detect the respective characteristic and in response to transmit an output signal indicative of the detected characteristic to the control transceiver means (col. 1, lines 28-35, col. 3, line 28 - col. 4, line 47 and col. 14, lines 36-59).

Tyburski fails to disclose the limitations of including antennas with each of the respective sensors and communicating directly with the sensors.

In a similar field of endeavor, Spillman, Jr. discloses smart structure (Fig. 4) which includes antennas with each of respective sensors 41-44 (col. 4, lines 12-26).

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Tyburski by including antennas with each respective sensor as shown by Spillman, Jr. for the purpose of sensing a plurality of characteristics and communicating with the transceiver separately from each antenna to detect and report each respective characteristic.

Regarding claim 2, which is dependent on claim 1, Tyburski already discloses a target wherein the target and sensors include only passive electronic devices (col. 3, lines 26-36).

Regarding claim 7, which is dependent on claim 1, Tyburski already discloses the limitation communicating between the control transceiver means 42 and the target element over a microwave frequency range (col. 7, lines 7-15).

Regarding claim 8, Tyburski discloses a wireless communication system comprising: control transceiver means, operable to communicate in a wireless manner with said number of actuators, for supplying a power signal to a desired number of said actuators so as to activate each respective antenna thereof and enable the desired actuator or actuators to cause said element to achieve the desired deformation (col. 1, lines 28-35, col. 3, lines 28- col. 4, line 47 and col. 14, lines 36-59).

Tyburski fails to disclose the limitations of including antennas with each of the respective sensors and communicating directly with the sensors.

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In a similar field of endeavor, Spillman, Jr. already discloses the limitation of enabling a sensor/actuator to perform physical deformations within the body of the target (col. 2, lines 52-58).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Tyburski in view of Spillman, Jr. by performing physical deformations within the body of the target as taught by Spillman, Jr. for the purpose of achieving a desired parameter in pressure, strain or some other characteristic.

Regarding claim 9 is incorporated by claims 2 and 8 and is therefore analyzed as previously discussed with respect to claims 2 and 8.

Regarding claim 13 is incorporated by the limitations of claims 7 and 8 and is therefore analyzed as previously discussed with respect to claims 7 and 8.

Regarding claim 14, Tyburski already discloses the limitation of storing the signal transmitted from a transceiver to the target and storing the signal in a memory (col. 3, lines 37-54).

Regarding claim 15, Tyburski already discloses the limitation of storing a signal in a capacitor bank (col. 10, lines 15-24).

Regarding claim 17 is incorporated by the limitations of claims 8 and 14 and is therefore analyzed as previously discussed with respect to claims 8 and 14.

Regarding claim 18 is incorporated by the limitations of claims 15 and 17 and is therefore analyzed as previously discussed with respect to claims 15 and 17.

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Regarding claim 21, Tyburski discloses a system for monitoring and/or deforming a structure in a desired manner, said system comprising:

control means for transmitting a modulated signal to a desired number of said devices in a wireless manner so as to activate each respective antenna thereof and enable each respective sensor to monitor the at least one predetermined characteristic of said structure and enable the respective actuator or actuators to cause said structure to deform in said desired manner (col. 1, lines 28-35, col. 3, lines 28- col. 4, line 47 and col. 14, lines 36-59).

Tyburski fails to disclose the limitations of including antennas with each of the respective sensors and communicating directly with the sensors.

In a similar field of endeavor, Spillman, Jr. already discloses the limitation of enabling a sensor/actuator to perform physical deformations within the body of the target (col. 2, lines 52-58).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Tyburski in view of Spillman, Jr. by performing physical deformations within the body of the target as taught by Spillman, Jr. for the purpose of achieving a desired parameter in pressure, strain or some other characteristic.

Regarding claim 22 is incorporated by the limitations of claims 2 and 21 and is therefore analyzed as previously discussed with respect to claims 2 and 21.

Regarding claim 25 is incorporated by the limitations of claims 7 and 21 and is therefore analyzed as previously discussed with respect to claims 7 and 21.

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Regarding claim 27, Tyburski already discloses the limitation of demodulating the received signal at the target prior to storing information carried by the signal.

Regarding claim 37, Tyburski discloses an element for use in a system for monitoring and/or deforming a structure in a desired manner, in which said element monitors at least one predetermined characteristic of said structure when operating as a sensor device and in which said element causes said structure to deform in said desired manner when operating as an actuator, and, in which a modulated signal is transmitted to said element in a wireless manner so as to activate the antenna thereof and enable said element to monitor the at least one predetermined characteristic of said structure when operating as a sensor device and enable said element to cause said structure to deform in said desired manner when operating as an actuator (col. 1, lines 28-35, col. 3, lines 28- col. 4, line 47 and col. 14, lines 36-59).

Tyburski fails to disclose the limitations of including antennas with each of the respective sensors and communicating directly with the sensors.

In a similar field of endeavor, Spillman, Jr. discloses smart structure (Fig. 4) which includes antennas with each of respective sensors 41-44 (col. 4, lines 12-26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Tyburski by including antennas with each respective sensor as shown by Spillman, Jr. for the purpose of sensing a plurality of characteristics and communicating with the transceiver separately from each antenna to detect and report each respective characteristic.

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Regarding claim 38, which is dependent on claim 37, Tyburski discloses an element wherein said element is adaptable to operate simultaneously as a sensor device and an actuator device (col. 14, lines 36-41).

Regarding claim 39 is incorporated by the limitations of claims 16 and 38 and is therefore analyzed as previously discussed with respect to claims 16 and 38.

Regarding claim 40 is incorporated by the limitations of 2 and 38 and is therefore analyzed as previously discussed with respect to claims 2 and 38.

5. Claims 46 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tyburski, in view of Examiner's Official Notice.

Regarding claim 46, Tyburski discloses an element as in claim 45. Tyburski does not explicitly disclose, wherein said energy storage device is a rechargeable type storage device.

Regarding claim 47, Tyburski discloses an element as in claim 46. Tyburski does not explicitly disclose, wherein said rechargeable type storage device is a thin film battery.

Regarding claims 46 and 47, Official notice is taken that it is well known in the art to use rechargeable type storage devices which are thin film batteries and therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Tyburski by using rechargeable storage devices for the purpose of obviating the need to use different batteries when the charge runs low and thereby saving a user this inconvenience.

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6. Claims 3-5, 10, 11, 16, 19, 20, 23, 24, 26, 28-36, 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tyburski, in view of Spillman, Jr. and Cole et al. ("Cole"), U.S. Patent No. 3,707,711.

Regarding claim 3, Tyburski in view of Spillman, Jr. fail to disclose the limitation of a sensor antenna which includes a substrate portion having non-linear material characteristics.

In a similar field of endeavor, Cole et al. disclose an electronic label which receives a signal from a transmitter (Fig. 3) wherein two sections of an antenna A are separated by a di-electric film, which corresponds to the claimed substrate portion, having nonlinear material characteristics (col. 4, lines 8-14 and 40-47).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Tyburski in view of Spillman, Jr. by including a substrate with non-linear characteristics within an antenna as taught by Cole et al. for the purpose of minimizing spurious signals and propagation loss from the antennas.

Regarding claim 4, which is dependent on claim 3, Spillman, Jr. further discloses a smart structure (Fig. 1) wherein actuators 16 are piezoelectric devices (col. 2, lines 52-58).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Tyburski, Spillman, Jr. and Cole et al. by including actuators which are piezoelectric devices as further taught by Spillman, Jr. for the purpose of performing physical functions within the body of the target.

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Regarding claim 5, which is dependent on claim 3, Tyburski already discloses the limitation of modulating a signal to transmit the output signal indicative of the detected characteristic to the control transceiver means (col. 1, lines 55-62).

Regarding claim 10 is incorporated by the limitations of claims 3 and 8 and is therefore analyzed as previously discussed with respect to claims 3 and 8.

Regarding claim 11 is incorporated by the limitations of claims 4 and 10 and is therefore analyzed as previously discussed with respect to claims 4 and 10.

Regarding claim 16, which is dependent on claim 1, Cole further disclose an antenna which is a strip line antenna (col. 4, lines 1-2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Tyburski, Spillman, Jr. and Cole by including a strip line antenna as further taught by Cole for the purpose of increasing the compactness of the antenna and thereby freeing up space for other elements in the target.

Regarding claim 19 is incorporated by the limitations of claims 8 and 16 and is therefore analyzed as previously discussed with respect to claims 8 and 16.

Regarding claim 20, which is dependent on claim 10, Tyburski et al. already disclose the limitation of demodulating the received signal at the target prior to storing information carried by the signal.

Regarding claim 23 is incorporated by the limitations of claims 3 and 21 and is therefore analyzed as previously discussed with respect to claims 3 and 21.

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Regarding claim 24 is incorporated by the limitations of claims 4 and 21 and is therefore analyzed as previously discussed with respect to claims 4 and 21.

Regarding claim 26 is incorporated by the limitations of claims 16 and 21 and is therefore analyzed as previously discussed with respect to claims 16 and 21.

Regarding claim 28, Tyburski discloses a system for causing a structure to be deformed in a desired manner, said system comprising:

control means for transmitting a microwave signal in a wireless manner to a desired number of said sensors so as to activate each respective antenna thereof and enable each of said desired number of sensors to provide a sensed signal indicative of the measured at least one predetermined characteristic; and means for processing each said sensed signal and for supplying each processed signal to appropriate one or ones of the actuators so as to actuate the same and cause said structure to deform in said desired manner (col. 1, lines 28-35, col. 3, line 28 - col. 4, line 47 and col. 14, lines 36-59).

Tyburski fails to disclose the limitations of including antennas with each of the respective sensors and communicating directly with the sensors.

In a similar field of endeavor, Spillman, Jr. discloses a number of sensors each having an micro-strip type antenna and being located on or within said structure and being adaptable for measuring at least one predetermined characteristic of said structure (see Spillman, col. 4, lines 12-26 and Fig. 4);

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Tyburski by including antennas with each respective sensor as shown by Spillman, Jr. for the purpose of sensing a plurality of characteristics and communicating with the transceiver separately from each antenna to detect and report each respective characteristic.

The combination of Tyburski and Spillman, Jr. does not explicitly disclose a number of actuators each having an micro-strip type antenna and being located on or within said structure and being adaptable for causing said structure to deform in said desired manner when actuated.

In a similar field of endeavor Cole suggests a number of actuators each having an micro-strip type antenna and being located on or within said structure and being adaptable for causing said structure to deform in said desired manner when actuated (col. 4, lines 1-2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Tyburski, Spillman, Jr. and Cole by including a strip line antenna as further taught by Cole for the purpose of increasing the compactness of the antenna and thereby freeing up space for other elements in the target.

Regarding claim 29, which is dependent on claim 28, Tyburski already discloses control transceiver means 42 in Fig. 1 which is operable to communicate wirelessly with the target element.

Regarding claim 31 is incorporated by the limitations of claim 26 and further contains means for processing each sensed signal and supplying the processed signal to actuators.

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However, Tyburski already discloses target 32 in Fig. 3 which includes a processor shown as power regulation circuitry 72 which processes a sensed signal and supplies the sensed signal to actuators.

Regarding claim 30 is incorporated by the limitations of claims 7 and 29 and is therefore analyzed as previously discussed with respect to claims 7 and 29.

Regarding claim 32, it would have been an obvious modification of the system of Tyburski et al., Spillman, Jr. and Cole et al. to separate the processor means from the structure to minimize the space requirements and complexity of the structure.

Regarding claim 33 is incorporated by the limitations of claims 2 and 28 and is therefore analyzed as previously discussed with respect to claims 2 and 28.

Regarding claim 34 is incorporated by the limitations of claims 3 and 28 and is therefore analyzed as previously discussed with respect to claims 3 and 28.

Regarding claim 35 is incorporated by the limitations of claims 4 and 34 and is therefore analyzed as previously discussed with respect to claims 4 and 34.

Regarding claim 36 is incorporated by the limitations of claims 6 and 28 and is therefore analyzed as previously discussed with respect to claims 6 and 28.

Regarding claims 42 and 43, the combination of Tyburski and Spillman, Jr. disclose the limitations of claims 26 and 28, respectively. It is inherent that the target element in Tyburski includes a cover to protect it from external harm, and a slot and feedline are components of the film separating the antenna portions of Cole.

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Allowable Subject Matter

7. Claims 39 and 41 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record fails to disclose the limitations of each microstrip antenna including a grating layer of the target element.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Works et al. (US 3,852,755) disclose a remotely controlled transponder having a dipole antenna array (see Fig. 3).

Armstrong (US 5,461,385) discloses an RF/ID transponder system employing multiple transponders and a sensor switch (see figure).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joy K. Contee whose telephone number is (703) 308-0149, M-F, 5:30 to 2:00 p.m.

If attempts to reach the examiner are not successful, the examiner's supervisor, Dwayne Bost can be reached on (703)305-4778.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703)306-0377.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314, (for formal communications intended for entry or for informal or draft communications, please label "PROPOSED" or "DRAFT")

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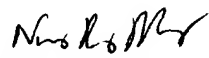
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December 14, 2001


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PRIMARY EXAMINER